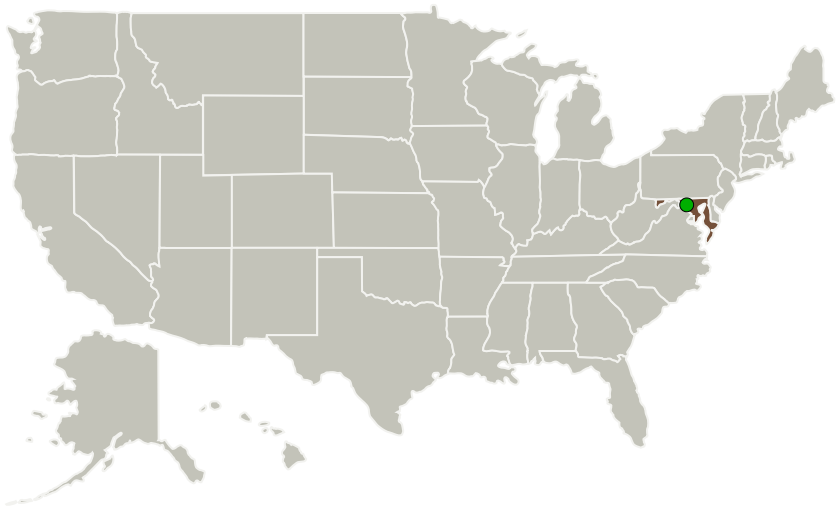
A Robust and Automated Hyperspectral Damage Assessment System Under Varying Illumination Conditions and Viewing Geometry, Phase I

Completed Technology Project (2014 - 2014)

Project Introduction

Some target signatures of interest in drought monitoring, flooding assessment, fire damage assessment, coastal changes, urban changes, etc. may need to be tracked periodically. In a typical change detection application, a hyperspectral image collected in an earlier visit may need to be compared with later images collected using different imagers with different viewing geometries, illumination, ground sampling distance (GSD), spectral sampling, signal-to-noise ratio (SNR), and atmospheric conditions. We propose a novel framework that can deal with all of the above challenges. We first propose to apply techniques such as flat-field to obtain the reflectance signature (fire damage signature, for example) from the target radiance signatures in a given hyperspectral image. The target reflectance signature is then saved in a target reflectance signature library for future use. After that, to detect targets (fire damage, for instance) in new images, we will expand a hyperspectral image processing system developed by the Johns Hopkins University/Applied Physics Lab (JHU/APL).

Primary U.S. Work Locations and Key Partners



A Robust and Automated Hyperspectral Damage Assessment System Under Varying Illumination Conditions and Viewing Geometry Project Image

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Organizations Performing Work	Role	Type	Location
Applied Research, LLC	Lead Organization	Industry Minority-Owned Business	Rockville, Maryland
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations
Maryland

Project Transitions

June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137686)*

Images

Project Image
A Robust and Automated Hyperspectral Damage Assessment System Under Varying Illumination Conditions and Viewing Geometry Project Image
(https://techport.nasa.gov/image/128918)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Applied Research, LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

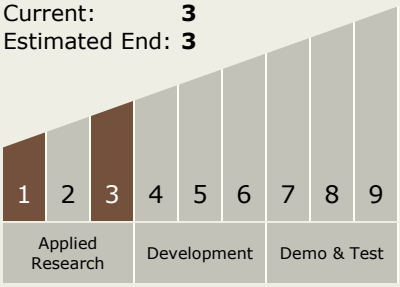
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Huamei Chen

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.2 Modeling
    - TX11.2.4 Science Modeling

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System